



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

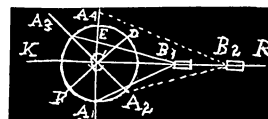
182. Proposed by A. H. HOLMES, Brunswick, Maine.

Evaluate  $\int_0^{\frac{1}{2}\pi} d\theta \sqrt{[1 + \sin^2 \theta (1 - 4 \cos \theta)]}$ .

### MECHANICS.

170. Proposed by ELISHA S. LOOMIS, Berea, Ohio.

Two angles of iron,  $A_1CD$  and  $A_1CA_3$ , move freely on a pivot at  $C$ . Rods  $B_1A_1$  and  $B_1A_3$  are attached respectively at  $A_1$  and at some point  $A_3$  so that when  $B_1$  moves along the rod  $CR$ , which is perpendicular to  $A_1A_4$ ,  $CD$  and  $CA_3$  shall coincide in position with  $CE$  which is perpendicular to rod  $KR$ . When angle  $A_1CD$  is  $135^\circ$  find  $CA_3$  in terms of  $CA_1$ .



Also find the following:

1. That value of  $CB_1$  which will require least effort exerted at  $B_1$  to cause  $CA_3$  to take the position  $CA_4$ .
2. That value of  $CB_1$  which will cause  $B_2A_2$ , if produced, to pass through the point  $A_1$ .
3. As  $CB_1$  varies in value, what is the locus of the intersection of  $A_1B_1$  and  $A_2B_2$ ? Of  $B_1A_3$  and  $B_2A_4$ ?
4. Suppose angle  $A_1CD$  to be any other angle than  $135^\circ$ , then find  $CA_3$  in terms of  $CA_1$ .

### GROUP THEORY.

5. Proposed by L. E. DICKSON, Ph. D., The University of Chicago.

In lieu of the incorrect developments of Burnside, *Theory of Groups*, pp. 56-58, show that an Abelian group of type  $(m_1, m_2, \dots, m_r)$ ,  $m_1 \bar{s} m_2 \bar{s} \dots m_r$ , has a subgroup of type  $(n_1, n_2, \dots, n_s)$ ,  $n_1 \bar{s} n_2 \bar{s} \dots n_s$ , if and only if  $s \bar{s} r$ ,  $n_i \bar{s} m_i$  ( $i=1, \dots, s$ ).

### MISCELLANEOUS.

145. Proposed by H. F. MacNEISH, Chicago, Ill.

Two complete 5-plane configurations in space having the same vertices are identical; in general two complete  $(n+2)$ -faces in  $n$ -space having the same vertices are identical.

### NOTES.

Dr. H. L. Rietz has been promoted to an assistant professorship at the University of Illinois.